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**Klausing et al.**

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(54) **MODULAR CASSETTE SYNTHESIS UNIT**

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See application file for complete search history.

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(57) **ABSTRACT**

Compact modular cassette systems and methods for the synthesis of radiopharmaceutical products are provided, the compact modular cassette system including a modular unit having valve plates, a reaction cassette, a reagent pack, and other seal and connector plates to ensure that reagents can be mixed together inside one or more chambers of the reaction cassette in a timely and efficient manner. When a new chamber for each new reaction or process should be used, a valveless modular system having removable reaction cassettes and the reagent packs may be used. In such a system, the reagent container, the reaction cassette, or both, can be removed from the modular cassette system and discarded after a desired reaction or process has taken place.

**30 Claims, 15 Drawing Sheets**

